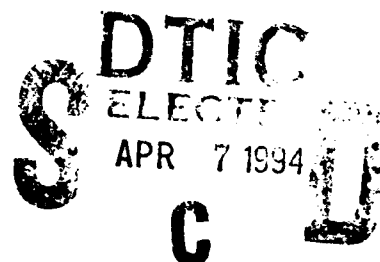


AD-A277 860



Final Technical Report



Grant No. N00014-93-1-0073

for support of

*The Symposium on Inorganic and Organometallic Polymers*

1993 Spring National ACS Meeting  
Denver, Colorado  
March 29 - April 2, 1993

Principal Investigator: Dr. Patty Wisian-Neilson  
Department of Chemistry  
Southern Methodist University  
Dallas, TX 75275-0314

DISTRIBUTION STATEMENT A

Approved for public release  
Distribution Unlimited

1288 94-06392

DTIC QUALITY INSPECTED 1

94 2 25 085

The program of the *International Symposium on Inorganic and Organometallic Polymers* reviewed the developments in the area of Inorganic Polymers since the previous symposium on this subject held at the Denver ACS Meeting in 1987. The program at this second meeting included 49 speakers from the United States, France, Germany, Japan, The Netherlands, and Italy, who gave 20 to 30 minute presentations. These were divided into six half-day sessions (Monday, March 28 through Wednesday, March 31) entitled Silicon-containing Polymers (2 sessions), Oxo-network Polymers (1 session), Poly(phosphazenes) (1 session), Main Group Element Polymers (1 session), and Metal-containing Polymers (1 session). In addition, 27 posters on these subjects were presented in the Polymer Division Tuesday evening session. These talks explored a multitude of important and often unique mechanical, thermal, photochemical, electrical, optical, and biomedical properties of Inorganic Polymers. Manuscripts from these papers and posters were published in *Polymer Preprints (Am. Chem. Soc. Div. Polym. Chem.)* 1993, 34(1). The relevant portion of the Table of Contents of *Polymer Preprints* is attached. Attendance at these sessions ranged from 40 to 200 people.

To acquaint those relatively new to the field, a tutorial session was held on Sunday afternoon, March 28 just prior to the regular sessions. Three one hour talks were presented by Harry Allcock, Dietmar Seyferth, and Walter Klemperer on "General Principles, Diversity of Systems, and Structure-Property Relationships in Inorganic and Organometallic Polymers", "A Survey of Organosilicon Polymers", and "Oxopolymers: An Introduction to Inorganic Network Polymerization", respectively.

Based on the vast interest in the meeting and a number of new developments in the field of Inorganic Polymers, the organizers have initiated the publication of papers related to this symposium as an *ACS Symposium Series Volume*. Approximately 35 manuscripts have been received and reviewed and are now being returned to the authors for corrections. The tentative Table of Contents of this book is also attached to this report.

# Table of Contents for ACS Symposium Series

author	Manuscript title
<b>Silicon containing polymers</b>	
H. Sakurai	Anionic Polymerization of Masked Disilenes to Polysilylenes. Mechanism and Applications
C. Biran, M. Bordeaux	Electrochemical Access to Di, Tri and Polysilanes
E. Fossum, K. Matyjaszewski	Stereoregular Polysilanes by Ring-Opening Polymerization
Joanne Schwark	Polysilazane Thermosets as Precursors for Silicon Carbide and Silicon Nitride
R. M. Waymouth	Substituent Effects on the UV Absorption of $\sigma$ -Conjugated Polysilanes
K. J. Wynne	Surface Properties of Polydimethylsiloxane-Urea-Urethane Copolymers with 1,4-Benzenedimethanol as Chain Extender
J. C. van de Grampel	Silicon Containing Resist Materials Based on Chemical Amplification
<b>Oxopolymers</b>	
C. J. Brinker	Structure-Property Relationships in Sol-Gel-Derived Thin Films
D. A. Loy	Porous Materials by Design. Plasma Oxidation of Hydrocarbon Templates in Polysilsesquioxanes
J. Livage	Sol-Gel Synthesis of Heterometallic Oxopolymers
A. R. Barron	A New Structural Model for Alumoxane Macromolecules
W. S. Rees, Jr.,	Use of the Reaction Products of Diols and Organoaluminum Compounds as Precursors to $Al_2O_3$ . Control over Ceramic Material Phase and Particle Size by Choice of Chemistry
H. K. Schmidt, Herbert Krug	Sol-Gel Based Inorganic-Organic Composite Materials

By \_\_\_\_\_  
 Distribution \_\_\_\_\_  
 Availability Code \_\_\_\_\_  
 Dist \_\_\_\_\_  
 Special \_\_\_\_\_  
 A-1

author	Manuscript title
<b>Polyphosphazenes</b>	
<b>H. R. Allcock</b>	Macromolecular and Materials Design Using Polyphosphazenes
<b>R. H. Neilson</b>	New Synthetic, Catalytic, and Structural Studies Related to Poly(alkyl/arylphosphazenes)
<b>P. Wisian-Neilson</b>	Backbone Coordination of Poly(alkyl/arylphosphazenes)
<b>W. T. Ferrar,</b>	Polyphosphazene Molecular Composites. In Situ Polymerizations of Silicon, Titanium, Zirconium and Aluminum Alkoxides
<b>M. Kajiwara</b>	Oxygen Gas Permeability and the Mechanical Properties of Poly(n-butylamino)(di-n-hexylamino)phosphazene Membranes
<b>M. Gleria</b>	Grafting Reactions onto Poly(organophosphazenes)
<b>Y. W. Chen Yang</b>	Poly[(bis- <i>p</i> -chlorophenoxy)phosphazene] /Polystyrene Blends: Preparation, Compatibility, and Properties
<b>M. L. White, K. Matyjaszewski</b>	Polyphosphazene Random and Block Copolymers with Alkoxyalkoxy and Trfluoroethoxy Groups
<b>C. E. Hoyle</b>	The Photophysics and Photochemistry of Poly(alkylarylphosphazenes) and Poly(methylphenylphosphazene- <i>graft</i> -polystyrene Copolymers
<b>Main group element polymers</b>	
<b>A. K. Roy</b>	Poly(alkyl/aryloxothiazenes), $[N = S(O)R]_n$ , A New Direction in Inorganic Polymers
<b>L.G. Sneddon/R. T. Paine</b>	Recent Developments in Borazine Based Polymers
<b>Y. Kimura</b>	Synthesis and Preceramic Applications of Poly(aminoborazinyls)
<b>C. Allen</b>	Quantitative Reactivity Studies of the Copolymerization Reactions of Inorganic Rings Containing Olefinic Substituents
<b>Y. Chujo</b>	Synthesis of Organoboron Polymers by Hydroboration Polymerization

<b>L. J. Henderson, Jr. Teddy Keller</b>	<b>Poly(Carborane-Siloxane-Acetylene) as Precursor to High Temperature Thermoset and Ceramic</b>
<b>Jim Jensen</b>	<b>Organoaluminum Precursors Polymers for Aluminum Nitride Ceramics</b>
<b>Metal containing polymers</b>	
<b>I. Manners,</b>	<b>Ring-Opening Polymerization (ROP) of Strained, Ring-Tilted Metallocenophanes: A New Route to Organometallic Polymers</b>
<b>M. E. Wright</b>	<b>Transition Metals in Polymer Chemistry: The Search for <math>\chi</math> (2) Organometallic NLO Polymers</b>
<b>M. Hanack</b>	<b>Transition Metalphthalocyanines as Structures for Materials Design</b>
<b>D. R. Tyler</b>	<b>Synthesis, Characterization, and Reactivity of a New Class of Photochemically Reactive Polymers Containing Metal-Metal Bonds Along the Polymer Backbone</b>
<b>D. S. Bohle</b>	<b>Structural and Spectroscopic Studies of <math>\beta</math>-Hematin the Heme Coordination Polymer in Malaria Pigment</b>
<b>Kenneth Gonsalves</b>	<b>Synthesis of Nanocomposites via Inorganic Polymeric Gels</b>

# ***POLYMER PREPRINTS***

***Volume 34***

***Number 1***

***March 1993***

**Published by The Division of Polymer Chemistry, Inc.**

***American Chemical Society***

---

**Papers presented at the Denver, Colorado Meeting**

---

**Copyright © 1993 by The Division of Polymer Chemistry, Inc.  
American Chemical Society. No papers may be reprinted without permission.  
Publication Date: March 5, 1993**

Liquid crystalline block copolymers. <u>E. Chiellini</u> , G. Galli, A.S. Angeloni, M.C. Bignozzi, M. Laus, E.I. Serhatli, Y. Yagci. ....	190
--	-----

#### **THURSDAY AM ( $\pi$ -Conjugated and High Carbon Content Systems)**

Synthetic approaches to carbon-rich and all-carbon networks. <u>F. Diederich</u> . ....	192
New approaches to all carbon ladder polymers: cyclization reactions of acetylenes. Q. Zhou, <u>T.M. Swager</u> . ....	193
Photostructuring of conjugated polymers. <u>K. Müllen</u> , A. Böhm, G. Flesser, R.O. Garay, H. Mauermann, S. Stein. ....	195
Conjugated polymers for organic LEDs: Poly[2,5-bis(3 $\alpha$ -5 $\beta$ -cholestanoxo)- phenylenevinylene] (BCHA-PPV); a processable, yellow light emitter. <u>E. Wudl</u> , S. Höger, C. Zhang, K. Pakbaz, A.J. Heeger. ....	197
Structurally perfect ladder polymers: Shape and conversion. M. Löffler, <u>A.-D. Schlüter</u> . ....	199
A new synthesis of polymers containing acetylenic groups. M. Strukelj, M. Paventi, <u>A.S. Hay</u> . ....	201
Synthesis of planar poly( <i>p</i> -phenylene) derivatives for maximization of extended $\pi$ -conjugation. <u>J.M. Tour</u> , J.J.S. Lamba. ....	203

#### **THURSDAY PM (Blocks, Grafts and Networks)**

Ring opening polymerization catalysts. <u>R.H. Grubbs</u> , L.K. Johnson, B.M. Novak, M. Hillmyer, A. Benedicto, M. France, S.T. Nguyen. ....	
Synthesis of polymer networks containing degradable polyacetal segments. <u>E.J. Goethals</u> , C.G. Trossaert, P.J. Hartmann, R.R. DeClercq. ....	205
Block copolymers via living transition metal initiated polymerizations: Change of mechanism and bimetallic initiator approaches. <u>B.M. Novak</u> , T.J. Deming. ....	207
Transport properties of poly(ethylene oxide)-siloxane networks containing lithium perchlorate. S. Boileau, P. Guegan, L. Lestel, <u>D. Teyssie</u> , H. Cheradame. ....	209
Synthesis of functionalized poly( $\alpha$ -olefins) via Ziegler-Natta catalysis: Homo- and copolymers. A.-L. Mogstad, M.R. Kesti, G.W. Coates, <u>R.M. Waymouth</u> . ....	211
Simultaneous hydrosilylation and ring-opening polymerization as a route to novel polymer architectures. <u>J.V. Crivello</u> , M. Fan. ....	213
Quantitative evaluation of a smart material: PVA-borate gelation and the gel's response to diols. <u>E.T. Wise</u> , S.G. Weber. ....	215

#### **INORGANIC AND ORGANOMETALLIC POLYMERS**

(Organizers: H.R. Allcock, K.J. Wynne, P. Wissian-Neilson)

#### **SUNDAY PM (Tutorial)**

General principles, diversity of systems, and structure-property relationships in inorganic and organometallic polymers. <u>H.R. Allcock</u> . ....	
A survey of organosilicon polymers. <u>D. Seyferth</u> . ....	

**Oxopolymers: An introduction to inorganic network polymerization. W.G. Klemperer.**

**MONDAY AM (Silicon-containing Polymers)**

**Unsaturated organosilicon polymers as preceramic and electrooptic materials.**

**T.J. Barton, Y. Ding, Y. Pang, S. Ijail-Maghaoodi. . . . . 217**

**Anionic polymerization of masked disilenes to polysilylenes. Mechanism and**

**applications. H. Sakurai, K. Sakamoto, Y. Funada, M. Yoshida. . . . . 218**

**Electrochemical access to di, tri and polysilanes. C. Biran, M. Bordeaux,**

**M.-P. Lèger-Lambert, F. Spirau, J. Dunogués. . . . . 220**

**Linear polysilylenes by ring-opening polymerization of cyclotetrasilanes. J. Chrusciel,**

**E. Fossum, K. Matyjaszewski. . . . . 221**

**New polymer pyrolysis routes to near-stoichiometric silicon carbide. D. Seyferth, M.**

**Tasi, H.-G. Woo, P. Czubarow, H.J. Tracy, J.L. Robison, G.E. Koppetsch, T.G. Wood. . . . . 223**

**Anionic polymerization of cyclic organosilicon compounds initiated by**

**trimethylsilylmethylithium. T. Zundel, L. Lestel, D. Teyssié, J.M. Yu, S. Bolleau. . . . . 225**

**C<sub>60</sub>-Siloxane polymers for hydrosilylation reactions. R. West, M. Miller, H. Takahashi,**

**T. Gunji, K. Oka. . . . . 227**

**MONDAY PM (Silicon-containing Polymers)**

**Functionalization of poly(phenyl)silane. J.P. Banovetz, Y.-L. Hsiao, R.M. Waymouth. . . . . 228**

**Synthesis, characterization and platinum catalyzed crosslinking of copoly(1-sila-cyclobut-**

**1-ylidene-1,4-phenylene). Properties of aromatic carbosilane thermoset.**

**C.Y. Liao, M.W. Chen, W.P. Weber. . . . . 230**

**Low temperature Wurtz-type polymerization of substituted dichlorosilanes. R.D. Miller,**

**E.J. Ginsberg, P. Jenkner, D. Thompson. . . . . 232**

**Comparison of dialkyl and alkyl-aryl substituted polysilanes in solution. P.M. Cotts. . . . . 234**

**Surface properties of polydimethylsiloxane-urea-urethane copolymers with**

**1,4-benzenedimethanol as chain extender. K.J. Wynne, T. Ho. . . . . 236**

**Silicon containing resist materials based on chemical amplification. R. Puyenbroek,**

**P. Werkman, J.J. Jansema, J.C. van de Grampel, B.A.C. Rousseeuw,**

**E.W.J.M. van der Drift. . . . . 238**

**Relationship between the structure and properties of silica membranes and film.**

**C.J. Brinker, N.K. Raman, R. Sehgal, D.L. Logan, T.L. Ward, S. Wallace,**

**R.A. Assink. . . . . 240**

**Structural characterization of sol-gel derived siloxane-oxide materials. F. Babonneau,**

**J. Maquet, S. Dire. . . . . 242**

**Porous materials by design, plasma oxidation of hydrocarbon templates in**

**polysilsesquioxanes. D.A. Loy, R.J. Buss, R.A. Assink, K.J. Shea, H. Oviatt. . . . . 244**

**TUESDAY AM (Oxo-network Polymers)**

**Sol-gel synthesis of heterometallic oxopolymers. J. Livage, F. Babonneau,**

**L. Bonhomme-Courty. . . . . 246**



A new structural model for alumoxane macromolecules. C.C. Landry, N. Pappé, A.W. Apblett, M.R. Mason, <u>A.R. Barron</u> .	248
Molecular growth pathways in titania sol-gel polymerization. Y. Chen, V.W. Day, T.A. Eberspacher, <u>W.G. Klemperer</u> , C.W. Park, F.S. Rosenberg, J. Hao..	250
Use of the reaction products of diols and organoaluminum compounds as precursors to $Al_2O_3$ . Control over ceramic material phase and particle size by choice of chemistry. <u>W.S. Rees, Jr.</u> , W. Hesse.	252
Inorganic polymers derived from silica and alumina. An ion conducting polymer obtained by reaction of $BaSi(OCH_2CH_2O)_3$ with tetraethylene glycol. K.W. Chew, B. Dunn, T. Faltens, M.L. Hoppe, <u>R.M. Laine</u> , L. Nazar, H.-K. Wu.	254
Polymer precursors to silicate ceramics: Studies of ceramic formation. <u>C.K. Ober</u> , M.H.E. Martin, L. Beecroft.	256
Towards biomimetic composite materials. Organic-inorganic composite materials possessing rigid chain, helical polyisocyanate templates. <u>B.M. Novak</u> , S.M. Hoff, Y. He.	258
Sol-gel based inorganic-organic composite materials. <u>H.-K. Schmidt</u> .	260
<b>TUESDAY PM (Polyphosphazenes)</b>	
Macromolecular and materials design using polyphosphazenes. <u>H.R. Allcock</u> .	261
New synthetic, catalytic, and structural studies related to poly(alkyl-arylphosphazenes). C.E. Wood, R.C Samuel, W.R. Kucera, C.M. Angelov, <u>R.H. Neilson</u> .	263
Backbone coordination of poly(alkyl/arylphosphazenes). <u>P. Wisian-Neilson</u> , F.J. Garcia-Alonso.	264
Polyphosphazene molecular composites II. In situ polymerizations of titanium, zirconium and aluminum alkoxides. B.K. Coltrain, <u>W.T. Ferrar</u> , C.J.T. Landry, T.R. Molaire, D.E. Schildkraut, V.K. Smith.	266
Oxygen gas permeability and the mechanical properties of poly(n-butylamino) (di-n-hexylamino)phosphazene membranes. <u>M. Kailwara</u> .	268
Grafting reactions onto poly(organophosphazenes). <u>M. Gleria</u> , F. Minto, P. Bortolus, G. Facchin, R. Bertani, M. Scoponi, F. Pradella.	270
The compatibility and properties of poly[(bis- <i>p</i> -chlorophenoxy)phosphazene]/polystyrene blends. <u>Y.W. C. Yang</u> , T.T. Wu.	272
Synthesis of polyphosphazene random and block copolymers. K. Matyjaszewski, M.S. Lindenberg, M.K. Moore, <u>M.L. White</u> .	274
The photophysics and photochemistry of poly(alkylarylphosphazenes). <u>C.E. Hoyle</u> , D. Creed, P. Subramanian, P. Chatterton, I.B. Rufus, P. Wisian-Neilson.	276
<b>TUESDAY (Posters) 6:00-8:00 PM</b>	
Towards identification of the stereoisomers of $Me_4Ph_4Si_4$ . <u>E. Fossum</u> , S. Gordon, J. Maxka, K. Matyjaszewski.	278
Temperature and solubility effects in the formation of polysilanes by the reductive-coupling of dichloro(organosilanes). R.G. Jones, <u>S.J. Webb</u> .	280

Light-emitting devices from poly[(silanylene)thiophene]s. <u>J.K. Herrema</u> , J. Wildeman, R.H. Wieringa, G.G. Malliaras, S.S. Lampoura, G. Hadzioannou. . . . .	282
Hydrosilylation of styrene-isoprene block copolymer. A.H. Gabor, E.A. Lehner, T.E. Long, G. Mao, E.C. Rauch, B.A. Schnell, <u>C.K. Ober</u> . . . . .	284
Hydrosilation of alkenyl azlactones. <u>K. Kumar</u> , S.V. Pathre. . . . .	286
A novel catalytic polymerization reaction. Coupling allyloxy and Si-H moieties. A. Sellinger, <u>R.M. Laine</u> . . . . .	288
Synthesis of carboxilane monomers and polymers with mesogenic pendant groups. <u>S.J. Sargeant</u> , W.P. Weber. . . . .	290
Poled ordered phenoxy-silicon polymers as second order nonlinear optical materials. <u>R.L. Jeng</u> , Y.M. Chen, J.I. Chen, J. Kumar, S.K. Tripathy. . . . .	292
Peroxide-substituted polysilazanes: Self-thermosetting ceramic precursors. <u>J.M. Schwark</u> . . . . .	294
Preceramic polysilazanes for structural applications. <u>S.T. Schwab</u> , R. C. Graef, C.R. Blanchard, Y.-M. Pan, D.L. Davidson, G.E. Maciel, B.L. Hawkins, S.F. Dec, M.F. Davis, R. Lewis. . . . .	296
Synthesis and characterization of polyphenylene-silica hybrid materials via sol-gel process. H.K. Kim, G. Yin, <u>C.K. Ober</u> . . . . .	298
Synthesis and properties of poly[(trimethylsily)silsesquioxane]. <u>H. Yamane</u> , Y. Kimura, T. Kitao. . . . .	300
Curable liquid polyalazane precursors for aluminum nitride ceramics. <u>J.A. Jensen</u> . . . . .	302
Synthesis and properties of end-reactive oligomers having organosilyl and amino groups. <u>Y. Nagasaki</u> , E. Honzawa, M. Kato, K. Kataoka, T. Tsuruta. . . . .	304
Studies of cross-linking of poly(dimethyl siloxane) networks by inverse gas chromatography. <u>Z. Tan</u> , R. Jaeger, G.J. Vancso. . . . .	306
Synthesis and characterization of triphenyl phosphine oxide containing polyimide-polydimethyl siloxane randomly segmented copolymers. <u>J.M. Wescott</u> , T.H. Yoon, L. Kiefer, D. Rodrigues, G.L. Wilkes, J.E. McGrath, M. Konas. . . . .	308
Poly(arylene ether)s containing phosphorus and heterocyclic pendant moieties. <u>D.B. Priddy, Jr.</u> , M. Franks, M. Konas, M.A. Vrana, T.H. Yoon, J.E. McGrath. . . . .	310
Heat-resistant thermosetting resins and maleimido prepolymers based on a novel tetrakisaminophenoxycyclotriphosphazene. <u>D. Kumar</u> , A.D. Gupta, M. Khullar. . . . .	312
Synthesis and characterization of polyphosphazenes for potential electro-optical applications. <u>A.J. Jaglowski</u> , R.E. Singler. . . . .	314
Chain terminators for polyphosphazenes. R.A. Montague, <u>F. Burkus II</u> , K. Matyjaszewski. . . . .	316
Synthesis routes to oxygen containing poly(alkyl/arylphosphazenes). <u>L. Bailey</u> , M. Bahadur, P. Wisian-Neilson. . . . .	318
Functionalization of polyphosphazenes: Synthesis and characterization of hydroxylic groups-containing poly[bis(alkoxy)phosphazenes]. <u>R. DeJaeger</u> , D. Houalla, C. Francart-Delprato. . . . .	320

New materials based on TEOS-poly(organophosphazene) systems. <u>G. Facchin</u> , G. Fantin, M. Gleria, M. Guglielmi, F. Spizzo. ....	322
Synthesis and properties of aryloxy and mixed substituent alkoxy/aryloxy poly(thionylphosphazenes) with halogen substituents at sulfur. <u>M. Edwards</u> , Y. Ni, M. Liang, A. Summer, J. Massey, G.J. Vancso, I. Manners. ....	324
Ab initio studies on mimics of substituted poly(thionylphosphazenes). J.B. Lagowski, <u>R. Jaeger</u> , I. Manners, G.J. Vancso. ....	326
Poly(ferrocenylsilanes): Synthesis, characterization, electrochemistry, and pyrolysis to magnetic ceramics. <u>D.A. Foucher</u> , R. Peterson, B.-Z. Tang, R. Ziembinski, N. Coombs, P.M. Macdonald, R.N.S. Sodhi, J. Massey, G.J. Vancso, I. Manners. ....	328
Synthesis of poly(ferrocenylgermanes) and poly(ferrocenylphosphines) via ring-opening polymerization. <u>C. Honeyman</u> , D.A. Foucher, O. Mourad, R. Rulkens, I. Manners. ....	330
<b>WEDNESDAY AM (Main Group Element Polymers)</b>	
New sulfur(VI)-nitrogen based inorganic polymers: Poly(alkyl/aryloxothiazenes), [N = S(O)R] <sub>n</sub> . Synthesis and characterization. <u>A.K. Roy</u> . ....	332
Synthesis, characterization and ceramic conversion reactions of borazine-modified hydridopolysilazanes. K. Su, E.E. Remsen, G.A. Zank, <u>L.G. Sneddon</u> . ....	334
Synthesis and processing of BN preceramic polymers. <u>R.T. Paine</u> , M. Fan, A. Hanprasopwattana, A.K. Datye. ....	336
Synthesis and preceramic applications of poly(aminoborazinyls). <u>Y. Kimura</u> , Y. Kubo. ....	337
Quantitative reactivity studies of the copolymerization reactions of inorganic rings containing olefinic substituents. <u>C.W. Allen</u> , D.E. Brown, R. Rayes, R. Tooze, G.L. Poyser. ....	339
Versatile reactions of organoboron polymers prepared by hydroboration polymerization. <u>Y. Chujo</u> , I. Tomita, M. Morimoto, N. Takizawa, T. Sakurai. ....	341
The preparation, characterization and use of boron containing preceramic polymers as precursors to sintered silicon carbide. G.T. Burns, <u>G.A. Zank</u> . ....	343
Thermally and oxidatively stable carborane-siloxane-acetylenic-based thermosetting polymers. <u>L.L. Henderson, Jr.</u> , T.J. Keller. ....	345
<b>WEDNESDAY PM (Metal-containing Polymers)</b>	
Ring-opening polymerization of strained, ring-tilted metallocenophanes: A new route to organometallic polymers. <u>I. Manners</u> , D.A. Foucher, B.-Z. Tang. ....	347
Transition metals in polymer chemistry: The search for $\chi^{(2)}$ organometallic NLO polymers. <u>M.E. Wright</u> . ....	349
Approaches to stereoregular polyferrocenylene persulfides. <u>D.L. Compton</u> , T.B. Rauchfuss. ....	351
Tetrazine-bridged phthalocyaninato metal complexes: A new class of intrinsic semi-conductors. <u>M. Hanack</u> , J.O. Barcina, J. Pohmer, E. Witke. ....	353
Synthesis, characterization, and reactivity of a new class of photochemically reactive polymers. S.C. Tenhaeff, J.J. Wolcott, <u>D.R. Tyler</u> . ....	354

Synthesis and chemistry of metallo poly(phenylene diacetylenes). <u>T.X. Neenan</u> , O.J.A. Schueller, H.D. Hutton, M.R. Callstrom. ....	356
Coordination polymers based on orthobenzoquinone: Synthesis, reactions, and properties of $[Ru_2(C_6H_4O_2)(CO)_4]_n$ . <u>D.S. Rohle</u> , P.A. Goodson. ....	358
Synthesis and characterization of metal ion binding polyesters containing 2,2'-biimidazole. <u>R.L. Lister</u> , H.L. Collier. ....	360
Synthesis of nanocomposites via inorganic polymeric gels. <u>K.E. Gonsalves</u> , T.D. Xiao, G.M. Chow, X. Chen, P.R. Strutt. ....	362

## **FLUOROPOLYMERS**

*(Organizers: P.E. Cassidy and T. Davidson)*

### **SUNDAY PM (Tutorial)**

An overview of organofluorine chemistry. <u>R. Flynn</u> .	
The chemistry of hexafluoroisopropanol-substituted aromatics. <u>J.W. Fitch III</u> .	
Synthesis of new fluoro-acrylates and fluoroepoxide monomers. <u>R.L. Soulen</u> .	
Functional fluoropolymers. <u>J. Griffith</u> .	
Polymers containing the hexafluoroisopropylidene group. <u>P.E. Cassidy</u> .	
Introduction to commercial fluoroplastics. <u>A.E. Feiring</u> .	

### **MONDAY AM (Special Properties)**

Fluorine-19 NMR investigation of "6F" based amic acid model compounds. <u>C.D. Smith</u> , R. Mercier, H. Waton, B. Sillion. ....	364
Polymer dynamics studied by $^{19}F$ multiple quantum coherences. <u>D.A. Lathrop</u> , K.K. Gleason. ....	367
Photolysis of fluorinated polyimides. <u>C.E. Hoyle</u> , D. Creed, P. Subramanian, R. Nagarajan, C. Pandey, E.T. Anzures. ....	369
FTIR study of the influence of stereoregular PMMA morphology on its miscibility with poly(styrene-co-p-(hexafluoro-2-hydroxy-2-propyl)styrene). D. Luo, T.K. Kwei, <u>E.M. Pearce</u> . ....	371
Characterization of the electronic properties of the 6F and 3F groups. <u>D.E. Fiore</u> . ....	373
Effects of fluorine substitution on polarization and dielectric properties of polyimides. <u>G. Hougham</u> , G. Tesoro, A. Viehbeck, J. Chapple-Sokol. ....	375
Synthesis, properties, and applications of composite materials based on grafted copolymers of perfluoropolymers and perfluorinated monomers with functional groups. <u>B.V. Mislavsky</u> , V.P. Melnikov. ....	377
Photoelectron spectra and macromolecular structure of fluorine-containing polyether ketones. <u>T. Davidson</u> , P.D. Bourgeois. ....	379

### **MONDAY PM (Synthesis)**

Low dielectric, fluorinated polyimide copolymers. <u>D.M. Stokley</u> , A.K. St. Clair, C.I. Croall. ....	381
--	-----